The pirarucu net: Artefact, animism and the technical object

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Abstract
This article explores the decision of a group of Amazonian lake fishermen to ban the use of nets to catch the pirarucu fish as part of an official agreement. It discusses the approach to artefacts found in the agentive turn and in recent explorations of Amazonian animism in Anthropology. It adopts the concept of technical object influenced by the anthropological approach to technology and in line with the ontogenetic perspective of Gilbert Simondon. The main focus is the way in which the fishermen compare the different modes of existence of the harpoon and the net. For them, the pirarucu net is a poor way to catch fish since it captures by itself, which is a form of cowardice in relation to the fish and drives them away. The ethnography centres on the operation of these objects and the way in which different properties of the fishermen and fish emerge through these processes.

Keywords
Amazon, anthropology of technology, fish, Gilbert Simondon, technical object

This article explores the decision of a community of Amazonian lake fisherman to ban the use of nets as part of an official agreement with the Brazilian environmental authorities in a protected area north of the mouth of the Amazon River. The main factor informing the fishermen's decision is the different meaning of this fishing gear. Following their own perspective, the ethnographic approach here centres on the operation of these objects and the way in which fishermen and fish alike are implicated within it. I point out some of the possibilities and limitations of the approach to

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Figure 1. Many aspects commonly found in the ethnography of hunting are present here, and the catch is described as both an erotic act and a duel. © Photograph: Carlos Sautchuk.

artefacts and animals found in the agentive turn and in recent explorations of Amazonian animism. As an alternative, I adopt an approach based on the technical object (TO) inspired by the anthropological approach to technique and the ontogenetic perspective of Gilbert Simondon (2017).

Trap or trust

Vila Sucuriju is a riverine community with a little over 500 inhabitants, situated in the state of Amapa, on the Brazilian coast, in the region by the mouth of the Amazon River. Although they share the same history and the same economic system, based on a kind of debt bondage (*aviamento*), there are two distinct groups of fishermen in the village, specialized in two of the most important fishing modalities found in this estuarine region (Sautchuk, 2007). One group works on the coast with motor boats with between three to six crew members using longline fishing. The other group, the one studied in this article, numbering around five dozen people, frequents a large lake region (a wetland connected to mangrove swamps), where they perform one of the best known and most widespread Amazonian fishing techniques (Veríssimo, 1970). Navigating with canoes and paddles, they use harpoons to catch the pirarucu (*Arapaima gigas*) (see Figure 1), the Amazon's largest scaled fish, capable of growing up to three meters in length and weighing 200 kilos. Since the waters are dark, the harpooner normally does not see the fish directly, but takes aim based on signs produced on the surface by the fish's movements below, or when the pirarucu turns suddenly as it comes to the surface to perform its aerial breathing. The pirarucu, which is considered a person, is known for being a clever and skillful fish, capable of tricking and defeating the fisherman.

The use of fishing nets in the Amazon estuary region intensified from the 1980s onward with the spread of nets manufactured from synthetic fibres. As part of these changes, a specific gill net, stronger and made locally with larger meshing, also began to be used to catch the pirarucu. While many harpooners from Sucuriju village resorted to this mode of capture in a more or less covert and limited form, there were mutual – and generally veiled – accusations concerning usage of this type of net. Though not banned, the object was viewed negatively. The most renowned fishermen were undoubtedly those who killed the fish 'just with the tip of the harpoon, who never resort to the net'. When deployed in combination with the harpoon, solely to increase the chances of a catch, the harpooner would generally minimize the net's role: 'I was just using a little net there.' Over time, though, use of the pirarucu net became more intense and something like a collective crisis of conscience was experienced by the harpooners.

In 2005, meetings were initiated to define a Term of Agreement with the Brazilian environmental agency, with the aim of providing a legal basis for fishing activities to continue in the lake region. The entire area had been included in the Lago Piratuba Biological Reserve, created without consultation with the fishermen in 1980. As a result of the discussions, it was agreed that a complete ban would be imposed on use of the pirarucu net, permitting the use of harpoons only, a norm still in force today. To the surprise of the environmental agents, when they proposed merely setting a limit on use of the nets, the lake fishermen themselves proposed an outright ban. Some important questions should be posed here concerning the conflicts and strategic convergences between fishermen and conservation agents, as well as the controversies among the harpooners (Sautchuk, 2007, 2017), none of which can be examined in this article. Suffice to observe here that the decision taken by the harpooners had nothing to do with absorbing the precepts of conservationism, even if they were well aware of the tactic and political character of the agreement.

Since the objective of this article is to understand the harpooners' decision, we need to focus more closely on the role that fishing gear – in this case, the net and the harpoon – play in defining the relationship with the fish and the water. First, though, it is worth noting that gill nets are used to capture other species in this region without provoking any unease. It should also be emphasized that the fishermen do not consider the net to be modern or foreign, in contrast to a traditional or local origin of the harpoon. Indeed, while the harpoon is based on local knowledge and skills, it also uses synthetic line, a metal point and is employed aboard a plank canoe exhibiting some European nautical traits and fitted with an outboard motor for long distances. Here I feel compelled to agree with Harris (2005) on the hybrid and situated character of the knowledge and techniques of *caboclo* or riverside populations in Amazonia. This entails that the origin – whether indigenous or European – of the objects is to some extent 'irrelevant' (p. 216) since what matters are the dynamics and skills with which they are employed. Precisely for this reason, formulating the question in terms of a sociotechnical level and a separate cosmological dimension also appears inadequate. Indeed, the harpooners are not distinguishing between practical and mythical logics, or modern and traditional ontologies, but contrasting the different ways in which these two objects operate.

My proposal, instead, is to discuss the rejection of the pirarucu net by setting out from its three negative issues identified by the harpooners themselves. Firstly, the net is not

bad because it reduces the quantity of fish in the region (as the state environmental agents think), but because it 'drives away' the pirarucu, making them vanish from the lakes. To pursue this question further without evoking an undue (or ethnocentric) separation between cosmology and technology, we need to investigate the mode of existence of the net as a kind of trap, and why it transforms the relational regimes between harpooner and pirarucu, based on the encounter and on trust (*confiança*). As we shall see, the second issue is that the net signifies a form of 'cowardice' (*covardia*) with the fish, provoking its 'distrust' (*desconfiança*). But there is also another problem, to be addressed first, which concerns the unease felt by the harpooners over the fact that 'the net fishes by itself,' in some ways distancing them from the type of protagonism implied by the harpoon. Here it is important to avoid a simplistic interpretation of the net's agency, whether this is taken to derive from human intention or its own animacy. On the contrary, this capacity for action seems to be related to the genesis of a new type of relation, one which qualifies the fisherman and the fish in another way.

The net fishes by itself: Agency and technicity

This subject evokes the more general theme of the relationship between agency and artefacts. In the so-called material cultural turn (Hicks, 2010) or agentive turn (Chua and Salmond, 2012), various different movements in this direction can be discerned, linked to the idea that objects possess attributes that social theory would usually limit to humans. Among these proposals are the idea of a biography or social life of things (Apparadurai, 1986), materiality (Miller, 2005) and, of course, the notion of agency (Gell, 1998), which destabilize the subject–object and function–meaning distinctions, opening up a spectrum of new interpretative possibilities (Hoskins, 2006). However, some authors (Hicks, 2010; Ingold, 2007; Knappett, 2005: 128) note the persistence of a culturalist and representationalist premise in those approaches. Even in the case of the recent artefact-oriented anthropology (Henare et al., 2007), authors like Holbraad (2010: 6) detect an essentially humanist-based proposal, even when the intention is to include and emancipate things. Underlying these ideas is a specific conception of the human itself, which is qualified by concepts, meanings and practices that are then extended to objects and things according to their effects. This pragmatic connection between effects and meaning would appear to be a powerful tool for exploring situations (modern or not) of circulation, consumption or signification in which the objectification of artefacts (and persons) seems to be an ethnographic fact.

   However, the kind of conflict that the harpooners experience with the net indicates, first of all, that the problem does not reside in the net itself, but in the way in which it operates; and second, that the net entails a transformation in the attributes of the harpooner himself, since it implies 'another kind of job', without a harpooner. The dynamics of the net thus redefines the attributes and forms of relation between the artefacts and humans. To understand this point, I turn to another kind of approach, sometimes identified as part of the same movement described above, but one that constructs an anthropological approach based on different premises and problems. I am referring to those studies that have focused not on the artefacts themselves, but on the processes in which they are embedded, identified through the terms techniques, technology or

socio-technical relation. In particular, certain works from STS or ANT (Actor-Network Theory), especially the early studies about objects and innovations (Akrich, 1992; Latour, 1996a, 1992, 2002), as well as French cultural technology (Lemonnier, 1993; Sigaut, 1994) and Ingold's (2000, 2013) anthropological approach to life and skill.

While the movement surrounding agency and materiality tends to emphasize the variety of meanings linked to the effects and circulation of artefacts, the processual or technical approach explores the efficacy of objects and their mediating role. Moreover, these approaches focusing on either artefacts or techniques derive from different strategies for amplifying the heuristic scope of anthropology. While notions like biography, agency and materiality broaden the epistemological reach of the human sciences to include things, for ANT, cultural technology and Ingold, the question is how to deal with relations and processes unattainable by the usual concepts and methods of social or cultural anthropology. Unable to expand further on this topic here, I wish merely to indicate the specificities of these perspectives amid the current anthropological interest in objects. Here we can cite the valuable comments (Coupaye and Douny, 2010; Naji and Douny, 2009) and debates (Ingold, 2007; Latour, 1996b; Lemonnier, 1996) that point to differences within the anthropology of technique and also its diverse approximations to material culture studies. Indeed, works like those of Warnier (2001) and Coupaye (2013) demonstrate the viability of the complementarity (and hence the difference) between these approaches.[1]

In ANT, Ingold's work or cultural technology, the dilemmas and debates centre on the proposal to avoid instrumentalism and material determinism as much as constructionism and symbolism, but maintaining focus on the processes through which objects acquire a 'functional' role (like tools and machines). In the case of ANT, the TO is stabilized through a redistribution of internal and external properties and actions, such that its boundary and functioning emerge simultaneously with the distribution of causalities between humans and non-humans (Akrich, 1992; De Laet and Mol, 2000; Latour, 1992). Meanwhile in Ingold (2011: 53), the object is permeated by skill, which does not reside in the human agent but in the activity, through a synergy between practitioner, tool and material. Ingold takes inspiration from Leroi-Gourhan (1993; see also Ingold, 1999) to characterize the relationship between skill and tool via a broader field of activity. In fact, Leroi-Gourhan is the main influence of Lemonnier (1992: 6) with his assertion that objects cannot be considered outside of the gestures that make them effective.

The comments on the latest book by Lemonnier (2012) reinforce significant convergences in these approaches to technique. Despite significant disagreements, Latour (2014) commemorates the fact that Lemonnier abandoned the strict connection between techniques and matter – revisiting a still valid debate (Latour, 1996b; Lemonnier, 1996; Knappett, 2005: 32) – thus providing an opening to different forms of relation in the constitution of objects. At the same time, Latour seems to recognize that the more localized vision, as advocated by Lemonnier (1993), we could say, aligns with the current politically urgent need to comprehend the specificities of the different 'material infrastructures'. Ingold (2014), for his part, albeit with criticisms, acknowledges an empirical convergence with Lemonnier, glimpsing the possibility 'to go back to basics' (p. 520), that is, to focus anthropology's attention on the dynamic of things. Ingold asks whether it would be better to start with substantives and things (objects, artefacts,

communication) like Lemonnier, or actions and relations (affects, materials, participation) like himself. His response is that the ideal would be to combine 'these two perspectives together'.

These convergences make explicit the current topicality of an anthropological approach to technology that focuses on the tension between being and relation. In this debate, it is possible to note an approximation, not always explicit or literal, with the ideas of the philosopher of technics and individuation Gilbert Simondon (2005b, 2017). Inspired by the latter's expression 'modes of existence', Latour (2013: 288) affirms the value of a 'regional ontology' generative of beings and things, which passes through technology. This modulates the generalist and simetric impetus of ANT insofar as it affirms 'a certain tonality of experience' in each particular case. For Ingold, subscribing to Simondon's critique of hylomorphism (i.e. the distinction between matter and form), the question is precisely of a way of rethinking the genesis of objects that shifts away from the paradigm of utility or production. In discussing the idea of transduction, which is central to Simondon's work, Ingold (2013: 102) characterizes the morphogenesis of TOs (like a kite or a cello) through the 'dance of animacy' that involves forces and movements of different kinds (like wind and sound). Ingold (2014) also notes the similarity between the transduction and the notion of resonators evoked by Lemonnier (2012) to characterize the relationship between the internal dynamics of the object and other dynamics, such as those involved in rituals. The recent employment of concepts taken from Simondon's thought, or that closely echo it, points to a similar intent: combining the functionality, relations and meaning of objects in the same approach, avoiding both a substantialist materialism and a projected or dematerialized agency present in many recent approaches identified with the material–cultural turn (Hicks, 2010: 46).

This highlights the potential of Simondon's work for the contemporary anthropology of techniques, above all, as it demonstrates that the critique of anthropocentric dichotomies (nature and culture, subject and object, material and immaterial, representation and real) should not marginalize the operative, functional or organic dimension. On the contrary, for Simondon (2017), the radical critique of both instrumentalism and humanism (or anthropocentrism) necessarily involves a reapproximation of TOs and their mode of existence. In line with the anthropologist Leroi-Gourhan (1943, 1993), Simondon rethinks the human sciences through the introjection of a relationship between life and technique into the core of its episteme (Bardin, 2015; Barthelemy, 2015; Stiegler 1998). Simondon and Leroi-Gourhan (inspired by Mauss, 2006) argue that the technique is not contained in objects, but rather that objects should be understood within the broader dynamic of technicity. Thus the TO not only performs a reversible mediation, but it also comprises a paradigm of the relationship between living beings and the environment and a model of the collective relation (Simondon, 2005a: 85, 2017: 250).

More than a theory, though, Simondon proposes an open method, presenting significant possibilities for ethnography for two reasons. The first is that his descriptive phenomenology of the TO does not seek to define what the TO is, nor to impose arbitrary criteria for its recognition or classification. Hence the attention he pays to the 'operative functioning' (Simondon, 2017: 251–252) is neither formalist nor utilitarianist, since no structure corresponds to a predefined use. The point for Simondon (2017: 246) is to follow the criteria for the genesis of the TO, which is never entirely self-contained, but

integrated into other genetic processes, or overdetermined. The simultaneity of relations and terms characterizes his ontogenetic approach, which has to be understood as part of the author's work on the processes of individuation (Simondon, 2005b), since the TO is always one among other geneses in course. For Simondon, it is impossible to explore technicity without passing through the living and the collective, albeit without confusing them (Bardin, 2015; Barthelemy, 2015). Like Leroi-Gourhan (1993), Simondon (2017) does not see technicity as exterior to life, but as a mode of being, a system of coordinated actions that emerge concomitantly with the regimes of individuation, including that of humans.

For Simondon (2017: 25–26):

> … instead of starting out with the individuality of the technical object, or even with its specificity, which is very unstable, it is preferable to reverse the problem, if we want to try to define the laws of its genesis in light of its individuality or specificity: one can define the individuality and specificity of the technical object on the basis of the criteria of its genesis: the individual technical object is not this or that thing, given *hic et nunc*, but that of which there is genesis.

This invites us to adopt a different approach to the unease of the harpooners with the pirarucu net. Firstly, it should be noted that it does not merely signify the substitution of an artefact, but a new mode of relation (and individuation). The statement by the harpooners that the net 'fishes by itself there at the lake bottom' is a self-implied comparison. In other words, both net and harpoon are known to catch fish, but they engage and define humans in distinct ways. Precisely, as advocated by Simondon (2017), only an exogenous viewpoint (like the conservationist) can compare the objects just in terms of their utility or effects. It needs to be stressed, therefore, echoing Lemonnier (1992: 36), that what is being compared here are not the artefacts per se, but the processes, or operational sequences, which include fishermen, fish, materials, and so on. Furthermore, the criteria of comparison of TOs here are precisely the most important ethnographic question, relating to the rearrangements in the process of individuation.

In the regime of relations established by the harpoon, the TO is considered part of the fisherman himself, like 'the stingray and its stinger'. The harpoon is part of his gesture as an amphibious weapon that allows the fisherman to reach the bottom of the lake without swimming down with his own anatomical body. As well as the capacity to assume an aerial and aquatic trajectory, its ergonomic design reflects attributes of the harpooner (a handle fitted to his size, habit, skills and strength) and of the pirarucu. The metal point of the harpoon is modelled locally according to its contact with the fish deep in the water, penetrating its scales and attaching to its flesh. The genesis of this weapon results from a double compatibility with the regimes of individuation of harpooner and pirarucu. The line (*arpoeira*) initially establishes an internal correlation of the harpoon, fixing its head (pirarucu-like) to the handle (harpooner-like) and afterwards connects the harpooner and the fish, the *buiado* (lake surface) and the *fundo* (lake bottom). The operational dynamic of the harpoon implies an 'associated milieu' (Simondon, 2017: 59), a kind of *Umwelt* of the TO, which is not a space or an environment, but a 'pattern of energetic exchange' (Massumi, 2012: 28) that is part of the object. This means that the harpoon condition of

existence as a weapon passes through the forms of individuation of the harpooner as predator and the pirarucu as prey in an amphibious relation of perception and action.

In this form of transduction, the harpoon is not personified and does not have agency. However, it is through its dynamics – and the potential to extend and connect – that the harpooner and fish are understood as subjects. In other words, the harpoon is not an autonomous entity but part of the harpooner, part of his mode of subjectivity. This means that, to some extent, the pirarucu – or its affordances as the harpoon's prey – is directly implicated in the person of the harpooner, rooted in the gesture of the harpoon throw. In fact, this gesture depends on the pirarucu 'appearing to the harpooner', understood in terms of a relation of trust (*confiança*). This factor is crucial in these lakes, where masculinity and harpooning are strongly related in multiple ways (Sautchuk, 2015). The kind of ballistic and semiotic amphibiomorphism generated by the harpoon is central to personhood. Someone who 'does not kill' is not a proper subject capable of engaging in transpecies sociality in the lake region and in some circumstances may indeed be exiled from there. There is even a risk that the harpooner who starts to use a pirarucu net 'begins to lose faith in his harpoon'. This means he could lose his skills and properties, because 'who fishes at the lake bottom is the net, so it's already another type of job.'

In an artefact-oriented approach, the net tends to be viewed as a device that captures the fish in the water through a conjunction of the intentionalities and behaviours of the human and the animal, like a trap in Gell's (1996) formulation. But in the case of the pirarucu net, neither the fisherman nor the fish are related by the same properties. The transformation of the spatiotemporal transduction of affordances established by the harpoon also transforms the human and animal behaviours and intentionalities. Once fixed at the bottom of the lake, the net remains static, waiting for the fish for a certain length of time. This is not a trivial factor for them since, while the harpoon is considered part of the harpooner's extended body, the net fishes 'by itself' in a deferred way. Emphasizing their own passivity, the term used here to refer to the action of the fisherman with the net is *despescar* (literally 'to unfish', the opposite of fishing), referring to the act of taking the fish from the net, not that of 'meeting' or 'killing' it. Among these harpooners, *despesca* is synonymous with theft and accusing someone of capturing with a pirarucu net – outside of joking situations – may be deemed offensive. But if it is shameful for the lake fishermen, the net is also a problem in terms of the relation with the fish. Not for the same reasons, though, given that the mediating character of the TO involves precisely the compatibilization of different regimes of individuation.

The net is a cowardice: Animism and ontogenesis

The relation between the harpooner and the pirarucu is pervaded by characteristics found more widely in Amerindian ethnology (Descola, 2013; Viveiros de Castro, 1998) and indeed among hunters more generally (Ingold, 2000; Willerslev, 2004). The fish is considered a person and its capture understood in terms of either a seduction or an intersubjective agonistic duel. Like other lake beings, the pirarucu is controlled by the spirit master of animals *(donos)*, which may or may not allow them to appear to the harpooner. Improper treatment of the animal or its remains may induce a state of *panema*, a pan-Amazonian condition that, among other things, signifies a general incapacity of the

person to capture fish or game. The rare but dangerous possibility of the harpooner transmuting into a pirarucu is also reported and never ignored (Sautchuk, 2007).

These harpooners are called *ribeirinhos* (river dwellers) or *caboclos* (mestizos) (Adams et al., 2009; Harris, 1998), including among themselves. The historical emergence or creolization (Halbmayer and Alès, 2013) of the *caboclos* of Amazonia (Parker, 1985) reveals various continuities and similarities with the themes of Amerindian anthropology, particularly in relation to hunting (Wagley, 1976), or what Århem (1996: 189) calls a 'hunter's universe'. The theme explored here, concerning objects, points to a closer dialogue with the treatment of material culture in Amerindian ethnology, particularly its most recent developments. After occupying a central role in the region in both the materialist and aesthetic approaches, today this interest in objects has returned as a set of 'theoretical challenges' (Schien and Halbmayer, 2014: 430).

When examining the 'asymmetric power relations' (Schien and Halbmayer, 2014: 422) involved in intercultural situations, a focus on objects allows the analysis to shift beyond a simplistic equation of empowerment and dependency by adopting more complex approaches to their uses and meanings, exploring the local perspective of this contact (Brightman, 2012). Yet this new wave of attention to artefacts is very precisely related to the role that non-humans assume in indigenous ontologies, notably connecting artefacts to the regimes of production of the person in Amazonia, informed by the notions of animism and perspectivism. In this scenario, an object-centred approach signifies a positive complement (or counterpoint) to the focus on animals, enabling an approach more closely linked to the practical dimensions of indigenous life (Santos-Granero, 2009; Schien and Halbmayer, 2014). As part of this movement, one of the central ideas employed to rethink the meaning of the artefacts is the notion of agency (Gell, 1998), which has been debated and reformulated in Amazonian anthropology through a preoccupation with the body and personhood.

Even though the agenda is undoubtedly stimulating, these approximations between the ontological and material turns (Rival, 2012: 129) can present some limitations. In a general view, critiques not far from those addressed to the abstract or projectionist basis of agency (Holbraad, 2010; Ingold, 2007) are also considered in relation to animism and perspectivism (Willerslev, 2004). In Amerindian ethnology, there are arguments about the risk of a 'hazardous slippage' (Rival, 2012: 71) between some concepts, or even the possibility of erroneously making a direct link between agency, animacy and personhood (Halbmayer, 2012: 14). Pitrou (2015) also asks for a less generic and confusing approach to animism, especially focused on the particularities of different kinds of 'agentive configurations' (including different living and technical processes). Alongside similarly down-to-earth critics, Kohn (2013) argues that personhood is the product of direct interactions with nonhuman selves, while Costa and Fausto (2010: 99) suggest that the 'generative potential of actions' shows a rising tension between practice and ontology in the debate on animism. It is worth noticing, indeed, that this tension was already present in Descola (2013). Approaching this debate from the theme of the article, I shall argue that, when speaking of an ethnographic focus on 'actions' or 'practice', it is also important to consider objects and techniques in a dynamic way.

This preoccupation is in tune with a recent trend in studies of *caboclo* or traditional people of Amazonia (Harris, 2005; Van Velthem, 2007). But it is not a novelty

in the Amerindian case, especially when it comes to relations of predation. Rival (1996) explores the choices of different weapons (blowpipe and spear) among the Huaorani, demonstrating how hunting, and relations with animals and the forest more generally, cannot be considered without attending to the form in which certain weapons configure predatory relations (see also Erikson, 2001; Grenand, 1995; Lévi-Strauss, 1966: 50). This leads Rival (1996: 145) to note that studies of hunter societies in Amazonia have tended to neglect the practical knowledge of the living habits of animal species, prompting her to call for more attention to be given to hunting technology instead of animal symbolism. More recently, Rival (2012: 136) asks how to approach objects in animist contexts without reducing them to extensions of the body or to effects of the processes involved in the mutual constitutions of persons and things.

One possible solution would be similar to the approach taken by Kohn (2013), who considers ecological relations (including animals, plants, rivers) in continuity with the human through an amplification of the notions of life and semiosis. His proposal provides some valuable contributions such as the emergentism of selves, the provincialization of language and the idea that living thoughts extend beyond bodies. However, even though Kohn (2013: 91) makes a well-reasoned critique of the undifferentiated treatment of non-humans by STS, objects (like binoculars, canoes or shotguns) remain as blind spots in his account of the relation between life and selves. The absence is notable (Schien and Halbmeyer, 2014: 429), all the more so if we consider the role of TOs (of indigenous manufacture or otherwise) in the relations to life processes in Amazonia, reconfiguring affordances, beings and landscapes.

It is here that an ontogenetic approach to TOs can offer an alternative way to comprehend the dynamic of efficacy and their operational character. This allows techniques to be reconnected to language, life and the environment in a non-anthropocentric form without epistemological leaps. Moreover, it safeguards us against a certain hylomorphism, whether through the idea of unmediated semiosis between constituted selves, or through an ontological predefinition of the forms of agency or relations. Focusing on TOs allows us to consider them as ontogenetic processes, in a field in which the attributes of humans and animals are also redefined.

This seems crucial in the case of the unease over the pirarucu net, since while it represents a challenge to the harpooner's regime of personhood, it affects, for different reasons, the mode of existence of the fish. The fact that the net fishes by itself, transforming the fisherman's type of engagement, does not mean that it comes to possess the same agency or intentionality as the harpooner in relation to the fish. Indeed, there is no agency of specific to the human, but the modes of action and affordances of the harpooner. And the net does not act in the same terms. Rather than being the result of 'trust', capture with the net is a sign of a 'cowardice' towards the fish. Before rushing to see a generic agency of a non-human in this fact, though, it should be noted that the problem, in this case, resides in a kind of non-action. After all, the net is a problem precisely because 'it is the fish that entangles itself.' The cowardice here does not reside in the use of an excessive power against someone weaker, but in a treacherous form of behaviour: in this case, making another do something that is not proper to it (in another regime of individuation).

Due to the way it operates in the lakes to catch the fish – set fixed underwater – the pirarucu net can be conceived as a kind of trap. But it is necessary to understand this notion by considering the fishing gear from the 'viewpoint of the fish' (Monod, 1973), according to the nature of the actions experienced by the animal. This tells us that the cowardice does not reside in employing a deception, but precisely in the fact that 'the fish sees the net.' The harpooners consider the pirarucu to be extremely intelligent and smart, capable of tricking, anticipating their actions and responding to their gestures. Consequently, the harpooners do not set the net to deceive the fish, but in order to explicitly close a particular passage since the fish seeks a minimum of free space. But how then does it catch the fish?

The net operates a fundamental disjunction between the anatomical body of the harpooner, and the fish and its projections in the environment via their paths (*caminhos*). There is water, there is flow, but the pirarucu cannot pass through the mesh. The fish detects a danger, therefore, an abnormality: 'It's as though you arrive home and see something wrong, out of place.' After careful examination of this unusual blockade in the path, urgent necessity or anger may make it decide to hurl itself against the net violently with its bony head. But the fish may also be led to entangle itself out of fear, when the fisherman scares it in the water. In each case, it is the fish 'that sticks its face' in the net through its own action. This implies that if, like any TO, the net generates an associated milieu that forms part of its operation (Simondon, 2017: 59), then this includes these dispositions generated in the fish. Static and visible, the net causes the fish to act precisely because it ostensibly blocks its path. Capture thus depends on the net disabling the fish's shrewd and clever disposition, causing it to act in a regime of thoughtlessness, anger or fear. In this resides the cowardice of this form of static and explicit capture.

The net scares away the pirarucu: Artefact and technical object

While the harpooner feels unease and shame for his cowardice in using the net, the fish displays 'distrust' and no longer frequents the same places as the fishermen. For the harpooners, the net does not overfish, as the environmental agency officers imagine; rather it 'drives away' the pirarucu. Its operation does not lower the population. Instead it generates the effect most feared by the harpooners, spatiotemporal disencounter – 'distrusting', the fish vanish from the lake. But what does distrust mean and how does it come about? Instead of interpreting it as an outcome of a relationship between two living beings, we can analyse it considering the mediating (or ontogenetic) role of the net and the harpoon. In all, the new dynamic introduced with the use of the net brings about significant alterations to the amphibiomorphic associated milieu of the harpoon and the relation between the lake bottom and its surface. As well as its function as an effector, the harpoon also extends the perception to the bottom and simultaneously isolates (Simondon, 2005a: 90) the fisherman from the water. This changes, though, when the fisherman begins to jump into the water to set the net and leave it there, or to startle the fish towards it, thereby leaving 'his smell in the water'. Besides, the fish is subjected to an outrageous death, trapped and very often drowned, since the pirarucu also needs to breathe oxygen from the air. Hence the dead fish itself (which is now already *embiara*: that is, the prey

of someone) remains at the bottom for some time, or impregnates the fibres of the net with its odour (*pitiú*), driving away the other pirarucus, who communicate these abnormalities to each other.

This does not mean that some definitive impossibility exists in relation to the net (of an ontological kind, for example): after all, continued use of the net leads to partial transformations of the properties of fishermen and pirarucus, as happens in other parts of Amazonia. The issue here is to comprehend the dynamics of this resistance of the harpooners, who activate the political–regulatory dispositif of conservation in order to affirm the mode of relation of the harpoon.

Precisely because of its openness, the processual and relational approach of the TO distances itself from an artefactual perspective (Guchet, 2017: 28), which tends to animate objects through something that either precedes their operations (intentionalities) or succeeds them (effects). The pragmatist twist given to the material culture studies by Alfred Gell (1996) involves rejecting the dichotomy between function and meaning precisely via an emphasis on effects and intentionality, as found in the example of the net as a trap and an artwork. Anticipating his proposal of the notion of agency, Gell (1996) establishes in an earlier text, 'Vogel's net', two aspects connected to his previous interest in technology (Gell, 1999). The first is the idea of the trap as a drama, a 'mutual relationship' that 'communicates the idea of a nexus of intentionalities between hunters and prey animals, via material forms and mechanisms' (Gell, 1996: 29). Second, he claims that reaching this conclusion had only been possible thanks to 'a certain amount of exegetical material' relating to the meaning and functioning of the Anga eel trap, 'which could not be apparent to the uninstructed' (pp. 32–33). Here he bases his argument on the detailed ethnography provided by the anthropologist of technique Pierre Lemonnier on the construction and functioning of the trap.

Despite conceiving the trap as a human–animal nexus and advocating an ethnographic approach to its operation, Gell's proposal presents certain limitations when he seeks to make general propositions about artefacts and intentionality. For him, the trap contains the hunter's skill and knowledge, and can be seen as a text on the animal's behaviour (Gell, 1996: 27). He characterizes the artefact, therefore, through the pre-established attributes (skill, knowledge or behaviour) of the beings that it connects. This presages his notion of agency, which signifies the objectification in artefact-form of social agency, involving a primary intentional agent and secondary artefactual forms (Gell, 1998: 21).

However, this notion of intentionality and agency, as well as Gell's conception of the artefact, represents a limitation when it comes to understanding the pirarucu net. For example, it is impossible to concur with his generalization (Gell, 1996: 27) that traps are 'models of the hunter' and 'lethal parodies of the animal's *Umwelt*'. As we have seen, the net is a problem precisely because it operates in a very different form to the harpooner and provokes an explicit disruption in the pirarucu's usual *Umwelt*. Here we are compelled to recognize that the elements challenged (or changed) in the ontogenetic dynamics of the net are not a generic hunter and prey but harpooners and pirarucus. Cowardice, in this context, signifies that the harpooner no longer risks his personhood in the relationship with the animal since distrust implies that the fish is led to behave differently to the way that characterizes it as a subject. In other words, the net imposes a reorganization of the subjectification of the fisherman and fish that emerges with the harpoon.

In failing to acknowledge the ontogenetic (or emergent) status of the operational sequences, the artefactual approach presupposes a human know-how or knowledge (of the hunter) and a behaviour of the prey prior to their form of relation. Though rejecting utilitarianist or symbolic approaches to the artefact, such an approach affirms human or animal intentionalities and behaviours as though these existed independently of specific capacities for action and affordances. As some commentators have argued (Costa and Fausto, 2010; Rival, 2012), animist or ontologist projections seem to run the same kind of risk, particularly when it comes to the objects. The artefactual approach disregards or minimizes the ethnographic relevance of mediation or technical relations.

It is not incorrect to assert, it should be said, that both the harpoon and the net operate with the aim of capturing (or preying on) an aquatic being through a correspondence between the behaviours of fishermen and fish. Yet this generic statement does not tell us much about why the harpooners reject use of the net since, for them, the different modes of existence of these TOs involve their operation, which implies different ontogeneses of objects and living beings. While the harpoon operates through a perceptual–motile synergy with the shrewdness and agility of the pirarucu, the functioning of the net resonates with another regime of the fish's individuation. The harpoon throw always awaits the 'fish's signal' whereupon the weapon is hurled in the hope of a convergence with the uncertain movements of the pirarucu. Despite the capacity for movement and conceal-ment, the harpoon implements a regime where the main factor is the 'wait' (*espera*) for (or a dependence on) the fish's actions. The net, on the other hand, with its immobility and visibility, elicits the emergence of new attributes in the fish, indeed problematic for the (harpoonmorphic) subjectivity in these lakes. The net does not just act in place of the harpooner (as an artefactual approach would say), but it does so differently. The harpoon captures through a synergy with the paths and *Umwelt* of the pirarucu: it tries to be invisible, it goes into the water just as much as necessary. The net is visible: it stays in the water and captures through a regime of opposition, challenging the pirarucu's movement.

It is impossible, therefore, to bracket off the operation of the object, encapsulated between prior intentionalities and posterior effects. Seeking to establish a pragmatic equivalence between the trap and the artwork (with the aim of converging function and meaning), Gell (1996) approaches risks reducing both the dynamics of aesthetics (Morphy, 2009) and the dynamics of hunting. However, it is precisely in the way in which the net operates in the relationship between harpooner and fish that we need to identify the diacritical aspects of this ontogenetic relation. This is why, by focusing on process, the non-artefactual approach of the TO is in syntony with certain critiques (Ingold, 2007; Lemonnier, 2012) or re-elaborations of the definitions of artefact and agency. Whether through a methodological reconfiguration of the operational sequence (Coupaye, 2013) and the importance attached to the *how* of different forms of action (Ferret, 2014); or through the emergent character of properties (Kuchler, 2008) and the different agentive configurations (Pitrou, 2015) that pervade humans, objects and other beings.

One of the convergences between the non-anthropocentric approach to technics developed by Simondon (Barthelemy, 2015) and these current concerns of anthropology consists, precisely, of locating in the genesis of the TO the more general problems of

knowledge, action and being (Simondon, 2017: 171). Alongside his empirical approach, that seems to be the main reason to say that Simondon has a potential to revolutionize the studies about objects and beings (Ingold, 2013: 143; Knappett, 2005: 167). It is for precisely this reason that the TO approach loses by limiting itself to anthropocentrism (whether humanist or utilitarianist) or by being formulated according to variants or inversions of the subject–object scheme (Guchet, 2017). It is in its operational functionality that the political and moral (Latour, 2002) dimensions of the dilemma set by the pirarucu net resides, precisely because this TO emerges in a new relational ontogenesis of what we tend to call humans and animals, which also transforms the meaning and criteria of what we use to call agency.

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Note

1. In archaeology the notions of agency, things and artefacts are mobilized in an agenda proximate to the approach to techniques in anthropology, in which detailed interest in the forms and connections of the artefacts and diverse materials leads to investigations into the emergence of the human itself and its properties (Knappett and Malafouris, 2008). Knappett (2005: ch. 2), for example, deploys the notion of agency to explore the problem of animism and personhood, but via a reflection on the organism and the relationship between structure (matter) and organization (information). Hodder (2012) also underlines ecological and material processes, pointing to the co-constitution of humans and things through the idea of entanglement.

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